

Serial No. 09/901,746
January 21, 2004
Reply to the Office Action dated September 25, 2003
Page 3 of 11

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (currently amended): A resonator comprising:
a multi-layer substrate having an upper and lower surface and including at least two conductor layers which include at least two grounding conductor layers and a plurality of dielectric layers, one of the at least two grounding conductor layers being disposed on the lower surface of the multi-layer substrate;
a strip line disposed between the at least two grounding conductor layers;
a microstrip line disposed on the upper surface of said multi-layer substrate; and
a through hole formed in said dielectric layers to connect said strip line to said microstrip line; wherein
portions of the one of the at least two grounding conductor layers that is closest to said microstrip line are omitted; and
one of the omitted portions is aligned with the through hole and another of the omitted portions is aligned with the microstrip line.

Claim 2 (canceled).

Claim 3 (currently amended): A resonator according to Claim 1, wherein said omitted portions define openings in said one of the at least two grounding conductor layers.

Serial No. 09/901,746
January 21, 2004
Reply to the Office Action dated September 25, 2003
Page 4 of 11

Claim 4 (currently amended): A resonator according to Claim 3, wherein said at least one of the openings have-has one of a substantially rectangular shape and a substantially square shape.

Claim 5 (original): A resonator according to Claim 1, wherein said strip line has a substantially U-shaped configuration.

Claim 6 (original): A resonator according to Claim 1, wherein the resonator comprises only one said strip line.

Claim 7 (original): A resonator according to Claim 1, wherein the resonator comprises only one said microstrip line.

Claim 8 (currently amended): A resonator comprising:
a multi-layer substrate having an upper and lower surface and including at least two conductor layers which include at least two grounding conductor layers and a plurality of dielectric layers, one of the at least two grounding conductor layers being disposed on the lower surface of the multi-layer substrate, and one of the at least two grounding conductor layers that is closest to said microstrip line has openings formed therein;

a strip line disposed between the at least two grounding conductor layers;
a microstrip line disposed on the upper surface of said multi-layer substrate; and
a through hole formed in said dielectric layers to connect said strip line to said microstrip line; wherein

one of the openings is aligned with the through hole and another of the openings is aligned with the microstrip line.

Claim 9 (canceled).

Serial No. 09/901,746
January 21, 2004
Reply to the Office Action dated September 25, 2003
Page 5 of 11

Claim 10 (currently amended): A resonator according to Claim 8, wherein said-at least one of the openings have-has one of a substantially rectangular shape and a substantially square shape.

Claim 11 (original): A resonator according to Claim 8, wherein said strip line has a substantially U-shaped configuration.

Claim 12 (original): A resonator according to Claim 8, wherein the resonator comprises only one said strip line.

Claim 13 (original): A resonator according to Claim 8, wherein the resonator comprises only one said microstrip line.

Claim 14 (currently amended): A voltage controlled oscillator comprising:
a resonator including:

a multi-layer substrate having an upper and lower surface and including at least two conductor layers which include at least two grounding conductor layers and a plurality of dielectric layers, one of the at least two grounding conductor layers being disposed on the lower surface of the multi-layer substrate;

a strip line disposed between the at least two grounding conductor layers;
a microstrip line disposed on the upper surface of said multi-layer substrate; and

a through hole formed in said dielectric layers to connect said strip line to said microstrip line;

wherein portions of the one of the at least two grounding conductor layers that is closest to said microstrip line are omitted;

Serial No. 09/901,746

January 21, 2004

Reply to the Office Action dated September 25, 2003

Page 6 of 11

one of the omitted portions is aligned with the through hole and another of omitted portions is aligned with the microstrip line; and

a plurality of electronic component elements disposed on the upper surface of the multi-layer substrate and arranged to define a circuit.

Claim 15 (original): The voltage controlled oscillator according to claim 14, wherein the plurality of the electronic component elements and the resonator are electrically connected to each other.

Claim 16 (canceled).

Claim 17 (previously presented): The voltage controlled oscillator according to claim 14, wherein said omitted portions define openings in said one of the at least two conductor layers.

Claim 18 (currently amended): The voltage controlled oscillator according to claim 17, wherein said at least one of the openings have has one of a substantially rectangular shape and a substantially square shape.

Claim 19 (original): The voltage controlled oscillator according to claim 14, wherein said strip line has a substantially U-shaped configuration.

Claim 20 (original): The voltage controlled oscillator according to claim 14, wherein the voltage controlled oscillator comprises only one said strip line.

Claim 21 (original): The voltage controlled oscillator according to claim 14, wherein the voltage controlled oscillator comprises only one said microstrip line.